Drawing Amendments

Please replace in Figure 1E the uppermost item '24B' with '24D' as shown in the proposed Replacement Sheet to be consistent with the Specification.

Remarks

Thorough examination by the Examiner is noted and appreciated.

The drawings have been amended as required by Examiner. The claims have been amended to overcome Examiner objections as required by Examiner and to clarify Applicants invention.

Support for the amended claims is found in the previously presented claims, the Specification and the Figures.

No new matter has been added.

For example support for the amendments and new claims is found in Figure 1E, and the Specification at:

Claim Objections

The claims have been amended to overcome Examiners objections.

Claim Rejections under 35 USC 112

Claim 31 has been cancelled to overcome Examiners rejection..

Claim Rejections under 35 USC 103

1. Claims 18-22, 24, 25, 27-30, 32, 33, 35, 37-40, and 42-44 stand rejected under 35 USC Section 103(a) as being unpatentable over Karasawa et al. (US 6,720,628) in view of Zhou et al. (US 6,358,842) and Chen et al. (6,784,096).

Karasawa discloses an interconnect structure where a wiring layer (32a, 40, 42; Figure 13) is provided between a lower contact structure (80, 82) and an upper interconnect structure (84) in an upper contact layer (92) (see Figure 13; col 10, lines 46-63; col 11, lines 41-49; col 12, lines 38-47). Karasawa clearly identifies **drain gate wiring layers** e.g., 40 **formed in a second conductive layer 92** disposed between (electrically connecting) lower **contact section** 80 **(metal filled thru hole** formed in first conductive layer/interlayer dielectric layer 90 prior to forming second first conductive layer/interlayer dielectric layer 92) and **contact section** 84 **(metal filled thru hole** formed in second conductive layer/interlayer dielectric layer 92 **following** forming second first conductive

layer/interlayer 90) see col 8, lines 19-25; col 9, lines 52-56; col 10, lines 14-26).

Thus, the second interlayer dielectric layer 92 is formed on the wiring layer 40 which is between and overlying the lower contact 80 in the first interlayer dielectric layer 90 and the upper contact 84 in the interlayer dielectric layer 92 as shown in Figure 13 and explained in detail by Karasawa.

Therefore Karasawa does not disclose several aspects of Applicants disclosed and claimed invention including those elements in **bold type**:

With respect to claim 18:

"A contact interconnect structure comprising:

a semiconductor substrate comprising CMOS devices including active contact regions;

a first contact layer overlying the active contact regions comprising a first plurality of metal filled openings extending through the first contact layer thickness to the active contact regions;

a second contact layer overlying the first contact layer

comprising a second plurality of metal filled openings, **each of said second plurality of metal filled openings extending through the second contact layer thickness to a respective one or more of the first plurality of metal filled openings;**

wherein, the first plurality and the second plurality of metal filled openings form a physically continuous contact interconnect structure having an aspect ratio of less than about 4.5 with respect to a respective contact layer."

Examiner notes that the first and second contact structures of Karasawa are **electronically continuous** due to the intervening wiring layers.

See e.g., MPEP 2111.01:

> During examination, the claims must be interpreted as broadly as their terms reasonably allow. **This means that the words of the claim must be given their plain meaning** unless applicant has provided a clear definition in the specification. *In re Zletz*, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989).
>
> When not defined by applicant in the specification, the words of a claim must be given their plain meaning. In other words, they must be read as they would be interpreted by those of ordinary skill in the art. *In re Sneed*, 710 F.2d 1544, 218 USPQ 385 (Fed. Cir.

1983).

Nevertheless, Applicants respectfully note that they have amended their claims to overcome Examiners overly broad interpretation of Applicants claims language.

In contrast to Karasawa, Chen et al. disclose a method of **forming a barrier layer to line vias** where the **vias** are disclosed to have a width less than 70 nm or an aspect ratio greater than about 4.1 (see Abstract; Figures).

Even assuming *arguendo*, a proper motivation for combination, the combination of Karasawa and Chen et al., such combination fails to produce or suggest Applicants disclosed and claimed invention.

"Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).*

"wherein, the first plurality and the second plurality of metal filled openings form a **physically connected continuous contact interconnect structure** having an aspect ratio of less than about 4.5 with respect to a respective contact layer."

With respect to claims 21, 22, 27, 28, 29, 40, and 44, Examiner argues that since Karasawa "does not limit" his disclose structures to any particular materials including contact layers, silicided contact regions, and contact opening shape) that therefore "the disclosure of Karasawa encompasses all well-known" limitations claimed by Applicants. Examiners statement is made without any support in the MPEP or the case law and is nowhere taught or suggested by the cited references.

Moreover, even assuming *arguendo* an individual limitation is well-known, such a fact is insufficient to establish a *prima facie* case of obviousness.

"The fact that references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a prima facie case of obviousness without some objective reason to combine the teachings of the

references." *Ex parte Levengood, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993).*

"Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art." *In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).*

"Finally, when evaluating the scope of a claim, every limitation in the claim must be considered. Office personnel may not dissect a claimed invention into discrete elements and then evaluate the elements in isolation. Instead, the claim as a whole must be considered." See, e.g., *Diamond v. Diehr*, 450 U.S. at 188-189, 209 USPQ at 9.

2. Claims 26 and 36 stand rejected under 35 USC Section 103(a) as being unpatentable over Karasawa et al. in view of Chen et al., above, and further in view of Ono (IEE Trans on Electronic Devices, pg 1822 Vol. 42, No. 10, 1995).

Applicants reiterate the comments made above with respect to Karasawa et al. and Chen et al.

Even assuming *arguendo*, a proper motivation to combine the teachings of Ono with Karasawa et al. and Chen et al., the further fact that Ono discloses a gate length of less than about 45 nm without a corresponding disclosure or teaching of a contact interconnect structure does not further help Examiner in producing Applicants disclosed and claimed invention.

"Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).*

3. Claims 34 and 41 stand rejected under 35 USC Section 103(a) as being unpatentable over Karasawa et al. in view Chen et al., above, and further in view of Zhou (US 6,358,842).

Applicants reiterate the comments made above with respect to Karasawa et al. and Chen et al.

Even assuming *arguendo*, a proper motivation to combine the teachings of Zhou et al. with Karasawa et al. and Chen et al., the further fact that Zhou et al. discloses a single or dual damascene interconnect structure (see Abstract; Figures) and nowhere suggests or discloses a contact interconnect structure extending to an active contact region, does not further help Examiner in producing Applicants invention.

"Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).*

Conclusion

The cited references, singly or in combination fail to produce or suggest Applicants disclosed and claimed invention, and therefore fail to make out a *prima facie* case of obviousness.

Applicants have amended their claims to overcome Examiner objections and rejections. Based on the foregoing, Applicants respectfully submit that Applicants Claims are now in condition for allowance. Such favorable action by the Examiner at an early date is respectfully solicited.

In the event that the present invention as claimed is not in a condition for allowance for any other reasons, the Examiner is respectfully invited to call the Applicants' representative at his Bloomfield Hills, Michigan office at (248) 540-4040 such that necessary action may be taken to place the application in a condition for allowance.

Respectfully submitted,

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